

Factoring

Any [integer](#) which divides evenly into a given integer. For example, 8 is a factor of 24.

[Factoring](#) is like taking a number apart. It means to express a number as the product of its factors. Factors are either [composite numbers](#) or [prime numbers](#) (except that 0 and 1 are neither prime nor composite).

The number 12 is a [multiple](#) of 3, because it can be divided evenly by 3.

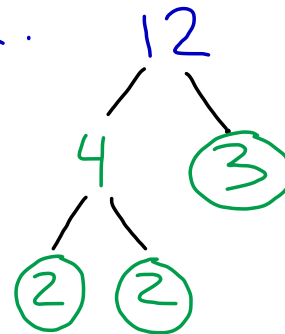
$$3 \times 4 = 12$$

3 and 4 are both **factors** of 12
12 is a **multiple** of both 3 and 4.

* factor trees look pretty, but Kramer's method is more effective.

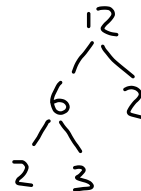
Factor Tree

1, 2, 3, 4, 6, and 12 are factors of 12



$$2 \times 2 \times 3 = 12$$

* they are helpful to find the prime factors, but where is 6? You would need a second factor tree



Preferred Factor Method

* find the factor sets

Example: factors of 12

$$1 \quad \text{and} \quad 12 \quad 1 \times 12 = 12$$

$$2 \quad \text{and} \quad 6 \quad 2 \times 6 = 12$$

$$4 \quad \text{and} \quad 3 \quad 4 \times 3 = 12$$

* notice how we double the number in the left column, and take half of the number in the right column until we hit an odd number and/or prime #

* when you hit a prime #, you are done.

* when you hit an odd # that is composite, find the smallest prime factor of that # such as 3, 5, 7, 11, etc.

Example: Factor 36

1 + 36

2 + 18

4 + 9

3 + 12

6 + 6

odd composite,
so we look for
prime factor, 3.

← here we were able
to double 3 +

* notice how doubling
6 + halving 6 would
yield a factor set
you already have

More examples

Factor 512

1	512
2	256
4	128
8	64
16	32

32 already have this set 16

Factor 72

1	72
2	36
4	18
8	9 3×3
3	24
6	12

Factor 28

1	28
2	14
4	7

Try these: (circle the prime factors)

Factor: 6

496

84

Solutions

Factor: 6

